

Chicago, Milwaukee, St. Paul and  
Pacific Railroad, Overhead Highway Bridge  
(Olivia Bridge No. 4772)  
Spanning the Twin City and Western Railroad  
on Trunk Highway 71  
Olivia vicinity  
Renville County  
Minnesota

HAER No. MN-77

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PHOTOGRAPHS  
WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record  
National Park Service  
Department of the Interior  
Denver, Colorado 80225-0287

## HISTORIC AMERICAN ENGINEERING RECORD

CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC RAILROAD,  
OVERHEAD HIGHWAY BRIDGE  
(Olivia Bridge No. 4772)

**Location:** Spanning the Twin City and Western Railroad on Trunk Highway 71, Olivia vicinity, Renville County, Minnesota.

**UTM:** 15.339400.496400  
USGS Danube, Minnesota Quadrangle

**Date of Construction:** 1929

**Present Owner:** Minnesota Department of Transportation, 395 John Ireland Boulevard - 612 E, St. Paul, Minnesota, 55155.

**Present Use:** The bridge is used for conveying vehicular traffic on Trunk Highway 71 over the Twin City and Western Railroad tracks.

**Significance:** This triple-span rigid frame concrete deck girder bridge is significant for being the oldest known structure of its type in Minnesota.

**Historians:** Frances P. Alexander, Holly K. Chamberlain, and Travis Dolence, The 106 Group Ltd., St. Paul, Minnesota, March 1994.

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## **LOCATION DESCRIPTION**

Chicago, Milwaukee, St. Paul and Pacific Overhead Highway Bridge is situated in a rural setting 1.6 miles northwest of Olivia, the county seat of Renville, County, Minnesota. Renville County is located west of Minneapolis. Constructed as part of a grade separation campaign, this bridge carries local vehicular traffic on the north-south Trunk Highway (TH) 71 over a track of the Twin City and Western Railroad (formerly Chicago, Milwaukee, St. Paul, and Pacific Railroad).<sup>1</sup> TH 71 intersects with TH 212 0.2 miles to the north of the bridge.

## **PHYSICAL DESCRIPTION**

Overhead Highway Bridge is a rigid-frame, continuous, concrete deck girder bridge with three equal spans. The bridge measures 148 feet 6 inches in total length with each of the three spans measuring 42 feet. The bridge carries a 27 foot wide roadway at a 55 degree skew, and there is a 23 foot vertical clearance above the single railroad track. The bridge has no sidewalks.

The rigid frame is constructed of five longitudinal girders which are spaced 7 feet on center. The interior girders are 1 foot 3 inches wide and 2 feet 10 inches deep in the center of the span. The 8 inch concrete deck was cast concurrently with the concrete girders. The bridge is supported by four independent concrete piers resting on spread footings. No piling was driven for foundation support. Concrete horizontal members act as cross bracing for the piers. The Overhead Highway Bridge has no abutments or wingwalls. The end vertical members were imbedded in fill, and this, used in tandem with an 8 foot deep apron, acts as the abutments.

## **HISTORICAL INFORMATION**

The Chicago, Milwaukee, St. Paul and Pacific Railroad (C. M. St. P. & P. R. R.) Overhead Highway Bridge was constructed in 1929 as part of a major early twentieth-century campaign to improve public safety by eliminating at-grade

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<sup>1</sup>The Twin City and Western Railroad took over the line in 1991 from the Soo Line Railroad, which had acquired the line in 1970 from the Chicago, Milwaukee, St. Paul, and Pacific Railroad. Tim Justy, Track Supervisor, Twin City and Western Railroad, Telephone Interview, 21 March 1994.

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railroad crossings.<sup>2</sup> Built by the C. M. St. P. & P. R. R., this triple-span rigid-frame concrete deck girder span was designed by Charles W. Bainbridge, who served as Bridge Design Engineer for the railroad. The previous crossing was at-grade and in a different location. Overhead Highway Bridge was designed in accordance with specifications which had been established by the state highway department in 1924, and the railroad company in 1928. Rigid-frame technology had been first successfully applied to bridges in about 1920 by Brazilian engineer Emilio Baumgart. In the United States, it was first used in 1922 by Arthur G. Hayden in providing above-grade crossings for parkways in Westchester County, New York.<sup>3</sup> Overhead Highway Bridge is the first known example of this type of construction in Minnesota. It achieved a certain level of notice in its day, being cited as an exemplar of its type in the 1939 book, Reinforced-Concrete Bridges by Frederick W. Taylor, Sanford E. Thompson, and Edward Smulski. Rigid frame deck girder bridges became widely used nationwide because of their economical cost and for their usefulness in settings requiring less vertical clearance.

The concrete aggregate for the bridge was brought in by rail. The concrete was cast in place utilizing an elevator-type structure for placement.<sup>4</sup> This bridge was constructed from 359 cubic yards of concrete, 68,556 pounds of reinforcing steel, 885 linear feet of wrought metal pipe, and 190 square feet of precast retaining wall.<sup>5</sup> Construction costs were estimated to be \$38,000, excluding engineering and construction supervision costs.<sup>6</sup>

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<sup>2</sup>The primary name for the bridge is taken from the title block on the original plans. The secondary name is the designation used by the Minnesota Department of Transportation.

<sup>3</sup>Carl W. Condit, American Building, Chicago: University of Chicago Press, 1982, pp. 259-60.

<sup>4</sup>Martin H. Herbers. Former Employee of the Minnesota Department of Transportation. Telephone Interview, 21 March 1994.

<sup>5</sup>Engineering Department, Chicago, Milwaukee, St. Paul and Pacific Railway, General Plan, Overhead Highway Bridge, 2.0 Miles West of Olivia, Minnesota, Drawing No. E-7424, Sheet 1, 1 March 1929; Specifications for Concrete and Reinforced Concrete, 1 November 1928.

<sup>6</sup>Engineering and construction supervision costs were not enumerated in any sources located.

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An agreement between the C. M. St. P. & P. R. R.. and the state of Minnesota dated March 21, 1929 detailed which party would be responsible for various portions of the construction and maintenance of the bridge. The railroad company was the primary agent of construction, binding itself to construct the bridge and backfill approaches thereto. However, the state agreed to pay one-half of the construction costs, as well as one-half the engineering and construction supervision costs. The state was also directly responsible for the construction of the bridge approaches and their paving, highway drainage facilities, and approach guard rails. In addition, the state carried out the legal requirement of petitioning the Minnesota Railroad and Warehouse Commission, which had to be consulted regarding any alteration or improvement of a railroad crossing, for permission to put the bridge in place, thereby achieving a grade separation.<sup>7</sup>

Generally speaking, the state bound itself to be primarily responsible for those aspects of maintenance most strictly oriented to the portions of the bridge it constructed, while the opposite applied to the railroad. An exception to this generalization is that the state took on the additional task of maintaining the wearing surface of the roadway and bridge railing, which makes sense in that those parts of the bridge primarily relate to conveying vehicular traffic over the tracks. Following that same line of reasoning but in reverse, the railroad bound itself to be responsible for maintaining the toe of the approach slopes in order to prevent the material used for backfilling from spilling on to the tracks and impeding train traffic.<sup>8</sup>

**Campaign to Eliminate At-Grade Railroad Crossings**

The effort to eliminate at-grade railroad crossings was begun in Minnesota in 1921, when the state's roadways had been under the control of the Minnesota Highway Commission for sixteen years<sup>9</sup>. The most common method of

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<sup>7</sup>State Highways Commission and Chicago, Milwaukee, St. Paul and Pacific Railroad Company, Construction Agreement for Bridge No. 1110, 21 March, 1929.

<sup>8</sup>State Highways Commission and Chicago, Milwaukee, St. Paul and Pacific Railroad Company, Bridge Construction Agreement, 21 March, 1929.

<sup>9</sup>For more information on the Minnesota Highway Commission, see HAER No. MN-71, Big Cottonwood River Bridge No. 246.

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removing at-grade crossings of railroad tracks was to relocate the road, often straightening the highway to smooth out dangerous curves and shortening travel distances at the same time. The next most common method of achieving grade separation in Minnesota during the 1920s was by constructing underpasses. Building overhead bridges was the least common.

A 1926 report from the Minnesota Highway Commission detailed how grade separated crossings were being gradually eliminated all over the state. According to this report, as outlined in a contemporary newspaper article, 382 such crossings had already been removed by the state since 1921, while 37 had been modified in 1926 alone. The campaign was slated to continue, as "a large number" of the 550 remaining unsafe at-grade crossings were to be eliminated over the next few years.<sup>10</sup> Overhead Highway Bridge, built in 1929, therefore represents the least common solution to the problem of at-grade crossings and constitutes a relatively late enhancement of public safety.

### **Alterations and Repairs**

Overhead Highway Bridge has fair integrity. It exhibits some general deterioration, particularly in the condition of the concrete members. There is spalling, with exposed reinforcing bar, in the cross struts and cracking in the exterior girders and the piers. The Minnesota Department of Highways Bridge Maintenance, Repairs, and Renewals record form indicates that Overhead Highway Bridge has received primarily minor alterations and repairs since its construction in 1929. These include painting of railings and placement of bulkheads in front of the abutments in 1937, repair of deteriorated beams in 1941, painting in 1949 and 1966, and repair of deteriorated curbs and rails in 1987. However, a more major undertaking occurred in 1977, when the original concrete posts and pipe railings were replaced with a solid concrete railing. The curbs and the roadway surface were replaced at the same time.<sup>11</sup>

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<sup>10</sup>Some at-grade crossings were considered at the time to be comparatively safe, as they spanned little-used tracks or were protected by gates or crossing guards. "382 Railway Grade Crossings Removed," Unknown Newspaper, 18 November 1926. Renville County Historical Society Records.

<sup>11</sup>Minnesota Department of Transportation, Bridge Inventory, Listing of Work by Bridge Number, 7 June 1993, pp. 153-154.

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## PROJECT INFORMATION

This documentation was prepared in March, 1994 at the request of the Minnesota Department of Transportation in compliance with Section 106 of the National Historic Preservation Act of 1966. Overhead Highway Bridge is slated for removal in 1995 due to a planned new alignment for Trunk Highway 71, elimination of steep approaches, below-standard vertical clearance and roadway width, and poor structural condition.<sup>12</sup> Project historians were Frances P. Alexander, Holly K. Chamberlain, and Travis Dolence of The 106 Group, Ltd., 658 Grand Avenue, St. Paul, Minnesota, 55105. Project photographer was Mike Whye.

## SOURCES

Condit, Carl W. American Building. (Chicago: University of Chicago Press), 1982, pp. 259-60.

Herbers, Martin H. Former Employee of Minnesota Department of Transportation. 5801 Stuart Ave., Edina, MN 55436-2514. (612) Telephone Interview. 21 March 1994.

Justy, Tim. Track Supervisor, Twin City and Western Railroad. Telephone Interview. 21 March 1994.

Minnesota Department of Transportation Records.

Minnesota Historical Society Records.

Renville County Highway Department Records.

Renville County Historical Society Records.

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<sup>12</sup>A similar undertaking was proposed in 1980 to take place in 1984. Minnesota Historical Society, The Minnesota Trunk Highway Archaeological Reconnaissance Survey Annual Report 1980, January 1981.

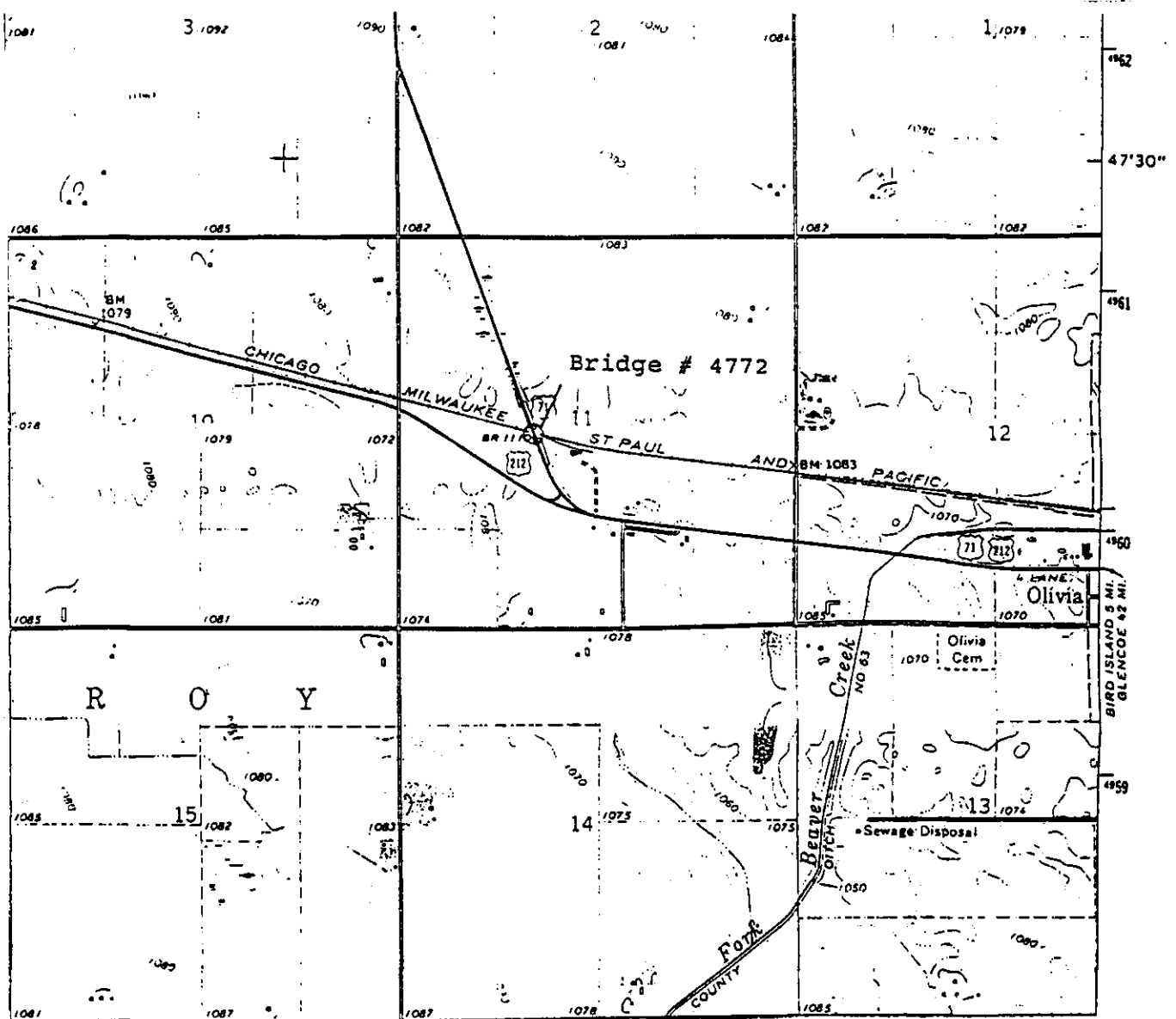
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**LIKELY SOURCES NOT YET INVESTIGATED**

Future researchers may wish to contact the Twin City and Western Railroad at (612) 864-7200 for possible additional information. When this documentation was prepared, no known historical materials were available from the railroad. The railroad refers to this bridge as Structure No. OA-0204-500.



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North ↑

**Source: USGS Danube, Minn. Quadrangle,  
1965, 7.5 m.  
Scale: 1:24000**